

Fig.1

Microsoft Internet Explorer provided by ATL Ultrasound

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Address: <http://www.atl.com/ATLLearningCenter/OnlineCaseStudies/Vascular/vascintro.asp>

ATL WEAVE ULTRASOUND

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Case Studies

Vascular

Beginning Case Studies About Learning Center ATL Conferences Resource Guide Interactive Learning Image Library Protocol Guides

These case studies have been approved by the Society of Diagnostic Medical Sonographers for 1.0 credit. These credits are accepted for laboratory accreditation and are accepted by the ARDMS, AART (Category A), and AMA (Category II).

Vascular Case Study #1 - Carotid Body Tumor
Darin Cournoyea, BSc, RDMS, RVT
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Vascular Case Study #2 - Right Popliteal Artery False Aneurysm with an Arterial Venous Fistula
Darin Cournoyea, BSc, RDMS, RVT
Peterborough Vascular Lab, Peterborough, Ontario, Canada

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Fig. 2

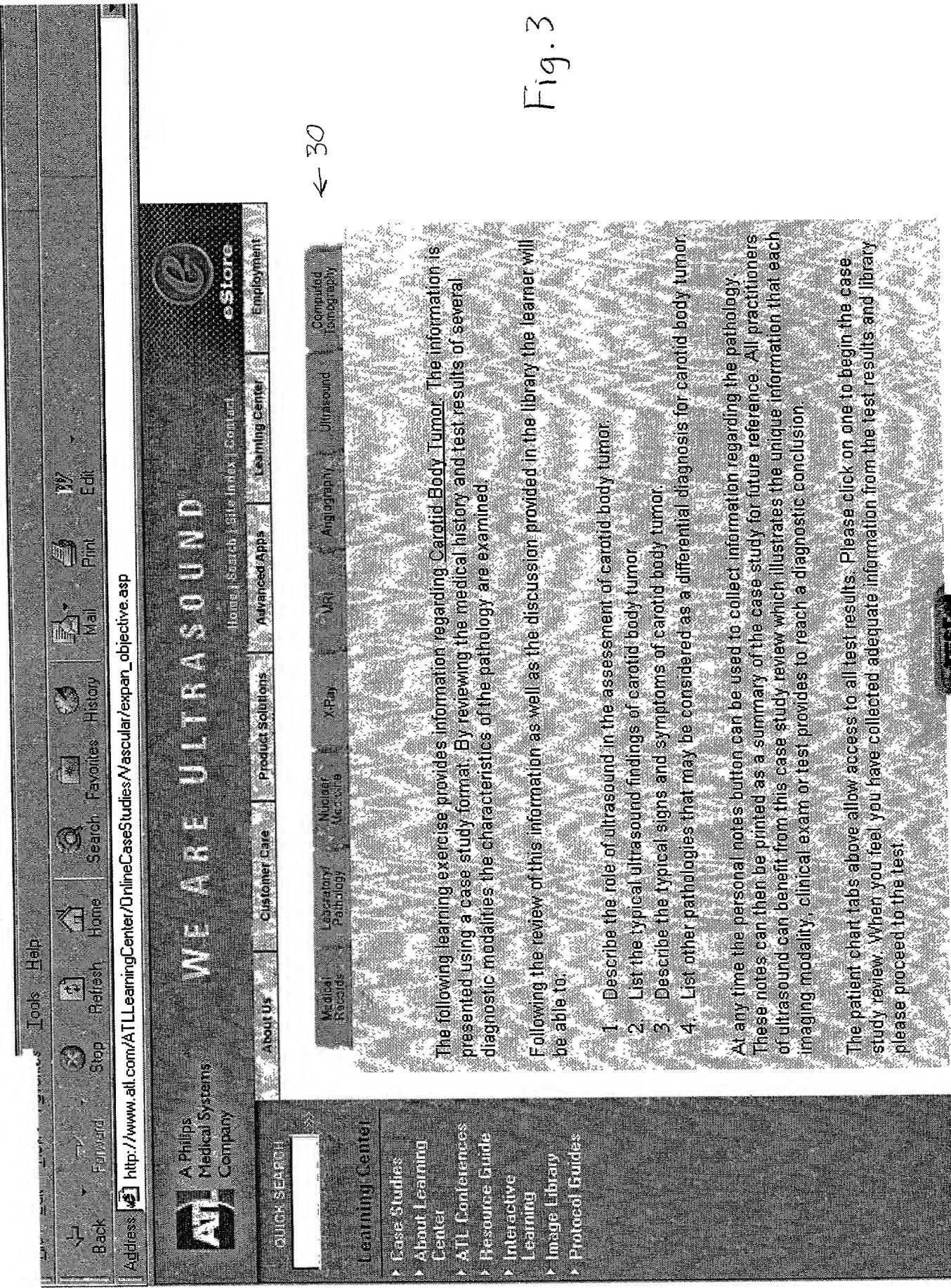


Fig. 3

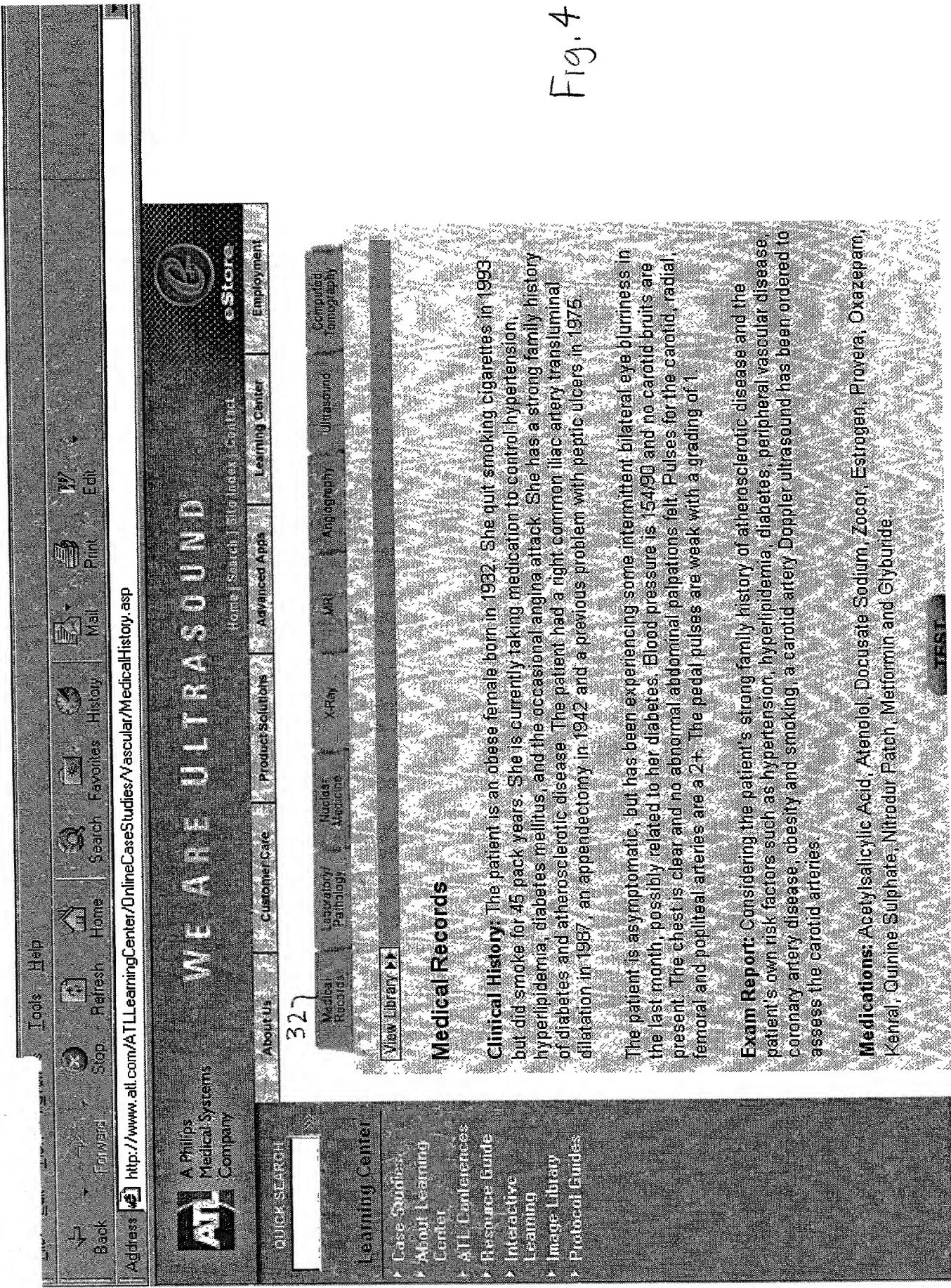


Fig. 4

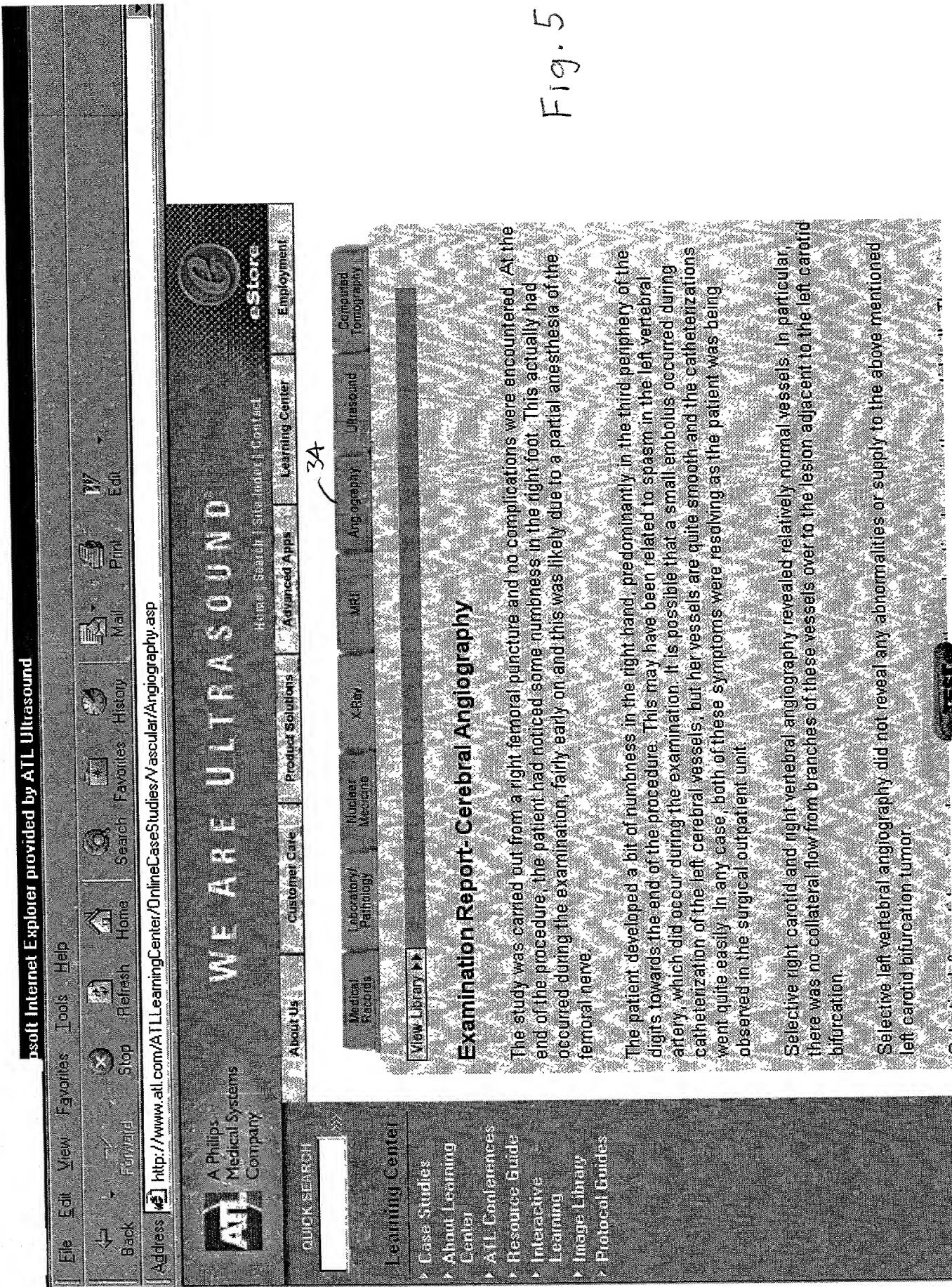


Fig. 5

The study was carried out from a right femoral puncture and no complications were encountered. At the end of the procedure, the patient had noticed some numbness in the right foot. This actually had occurred during the examination, fairly early on and this was likely due to a partial anesthesia of the femoral nerve.

The patient developed a bit of numbness in the right hand predominantly in the thumb, index and middle fingers towards the end of the procedure. This may have been related to spasm in the left vertebral artery, which did occur during the examination. It is possible that a small embolus occurred during catheterization of the left cerebral vessels, but her vessels are quite smooth and the catheterizations went quite easily. In any case, both of these symptoms were resolving as the patient was being observed in the surgical outpatient unit.

Selective right carotid and right vertebral angiography revealed relatively normal vessels. In particular, there was no collateral flow from branches of these vessels over to the lesion adjacent to the left carotid bifurcation.

Selective left vertebral angiography did not reveal any abnormalities or supply to the above mentioned left carotid bifurcation tumor.

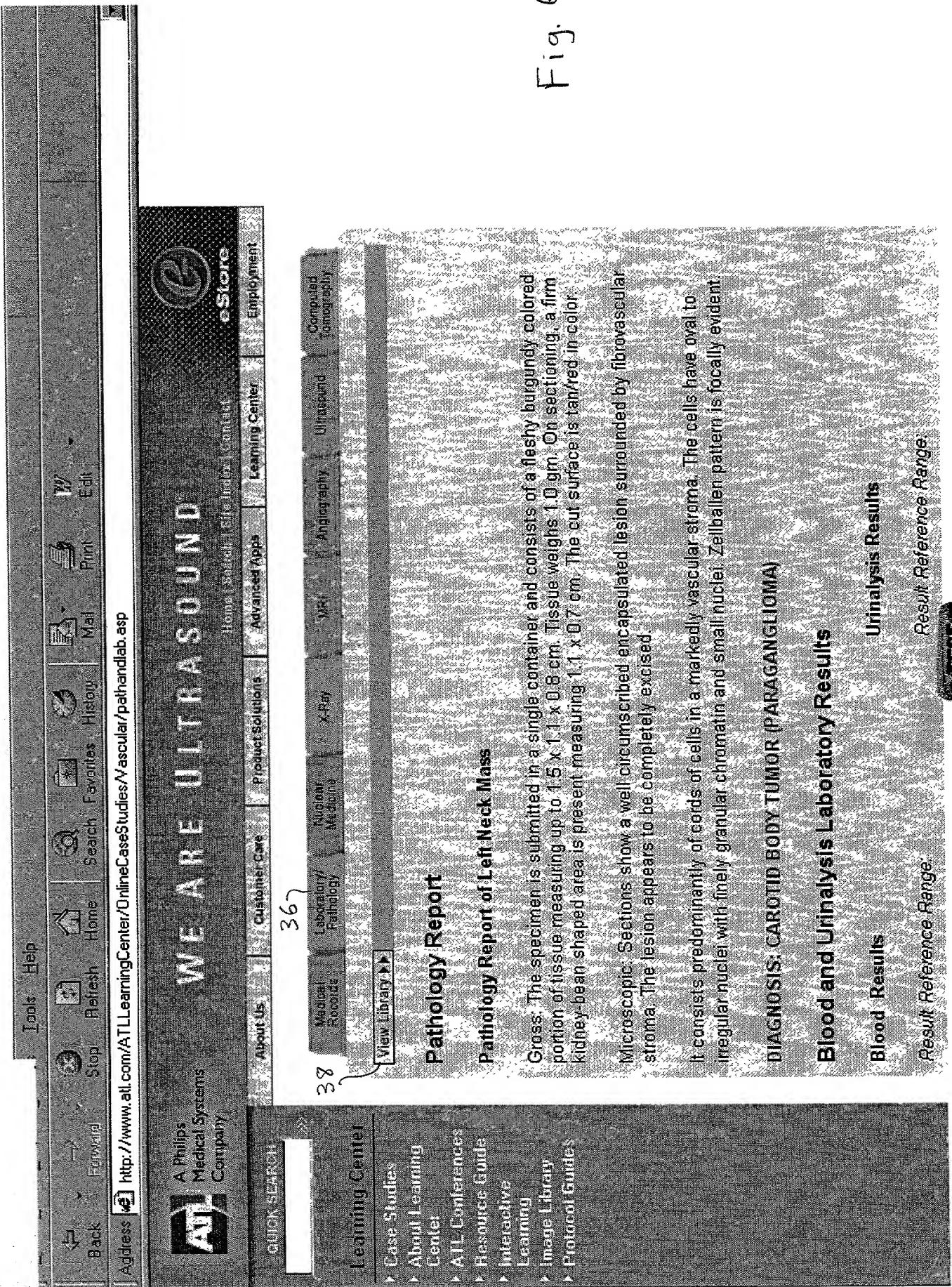


Fig. 6

Microsoft Internet Explorer provided by ATI Ultrasound

The screenshot shows the ATI Learning Center homepage. The address bar displays the URL: <http://www.ati.com/ATILearningCenter/OnlineCaseStudies/Vascular/Library.asp>. The page features a header with the ATI logo and the text "A Philips Medical Systems Company". Below the header is a search bar with the placeholder "QUICK SEARCH". The main content area has a title "WE ARE ULTRASOUND" and a sub-section "Discussion on Carotid Body Tumors". A sidebar on the right lists various medical imaging modalities: Medical Records, Laboratory Pathology, Nuclear Medicine, X-Ray, MRI, Angiography, Ultrasound, and Computed Tomography. The bottom of the page includes a "Learning Center" menu with links to Case Studies, About Learning Center, ATI Conferences, Resource Guide, Interactive Learning, Image Library, and Protocol Guides.

Fig. 7

Discussion on Carotid Body Tumors

What is a Carotid Body Tumor?

A carotid body tumor (CBT) is a neoplasm of a carotid body chemoreceptor located at the bifurcation of the common carotid artery into the internal carotid and external carotid arteries. The normal size of a carotid body is $5 \times 3 \times 2$ mm. This slow growing tumor has a rich vascular supply fed primarily by the ECA and its branches. The vertebral and thyrocervical arteries can also feed these tumors. Percutaneous needle aspiration of these tumors is strongly contraindicated due to the risk of hemorrhage. The tumor does not have a true capsule but is well circumscribed. Its color is reddish brown and has a rubbery consistency. The tumor sits in the notch between the ICA and ECA; therefore as the tumor grows it splays these arteries.

CBTs have been classified and described into 3 groups based on anatomic observations. Group I tumors are small and easily removed because they are not well adhered to the carotid vessels. Group II tumors are moderately larger with more difficult surgical excisions due to more extensive attachments. Group III tumors are very large and completely involve both the ICA and ECA. Complete arterial resection and grafting is often necessary.

CBTs are slow growing benign tumors that may be familial (autosomal dominant) or idiopathic. CBTs are usually unilateral but can also be bilateral with a 5% incidence for sporadic tumors and a

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Address <http://www.atl.com/ATLLearningCenter/OnlineCaseStudies/Vascular/test.asp>

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TEST The following test is multiple choice. Select the answer for each question by clicking on the button preceding your choice. A passing score is 70% correct answers.

Question 1 The vascular area demonstrated with the angiogram at the left carotid bifurcation would most likely be fed by?

A Branches of the internal carotid artery
 B Branches of the external carotid artery
 C Branches of the vertebral artery
 D Branches of the thyrocervical artery

Question 2 The carotid body tumor is typically located between the

A vertebral and subclavian arteries
 B carotid and subclavian arteries
 C external carotid and common carotid arteries
 D external carotid and internal carotid arteries

Question 3 A carotid body tumor can be identified with ultrasound as

A a solid mass in the carotid sheath
 B a large, well-circumscribed, solid mass
 C a large, well-circumscribed, fluid-filled mass
 D a large, well-circumscribed, calcified mass

Fri. 8

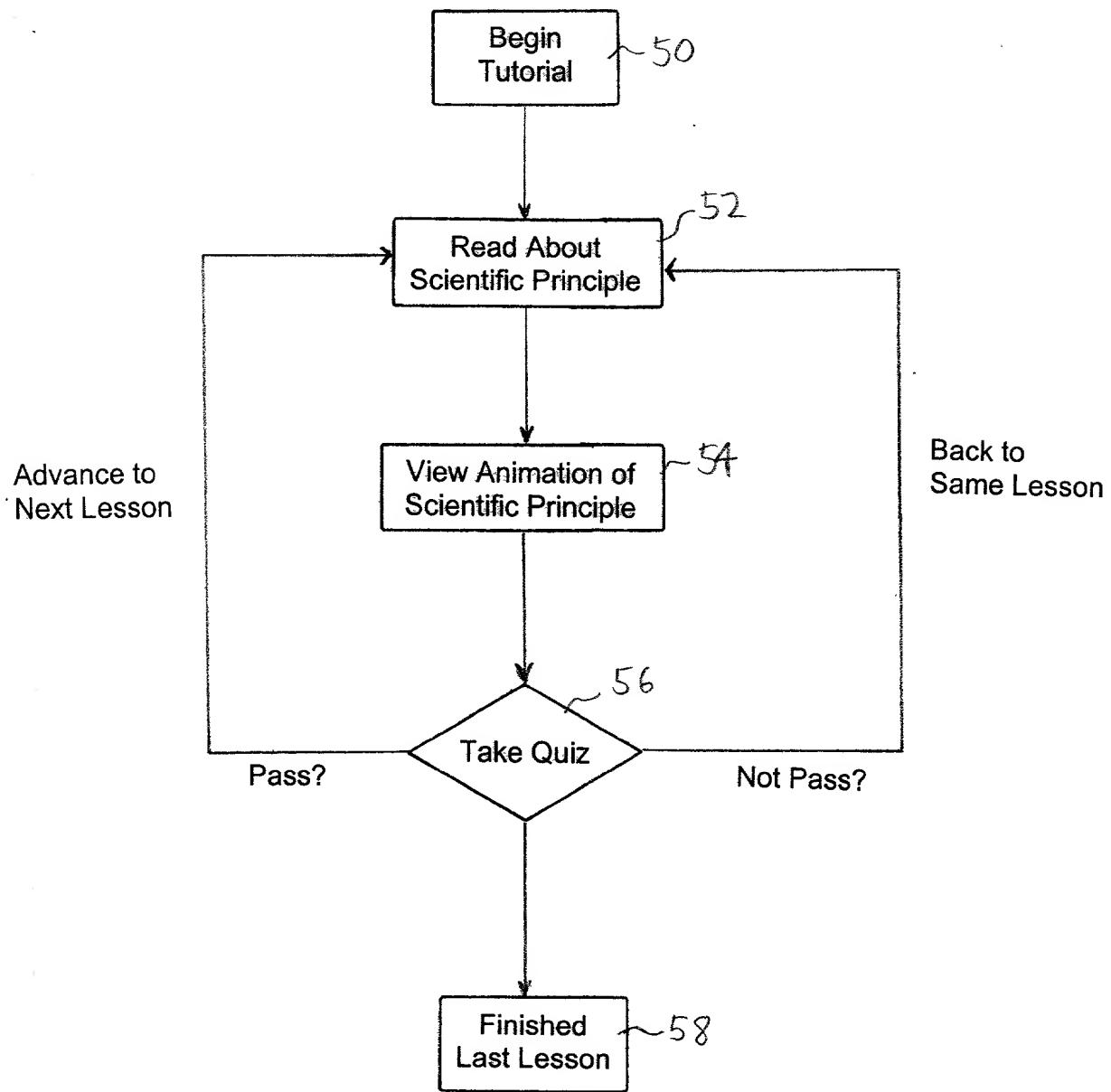


Fig. 9

Applications : Home Page - Microsoft Internet Explorer

Back Address http://learn.phcna.com/phcna/module/main.asp?mid=244&msscid=FX2G73DP2CSR26F40QJ74MQW/04D79E6B

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Doppler in Ultrasound Applications : Home Page

OBJECTIVES **OUTLINE** **SEARCH** **GLOSSARY** **TEST**

You have until September 12, 2011 to pass the test for this module before it expires.

LEARNING OBJECTIVES
A concise overview of the current module.

OUTLINE STUDY CONTENT
Displays a listing of the topics. Please review **all** of these topics before taking the assessment test.

SEARCH
Search by keyword or phrase.

GLOSSARY
Vocabulary for the current module.

ASSESSMENT TEST
Once you have studied all sections in this module, click here to take the test.



Fig. 10

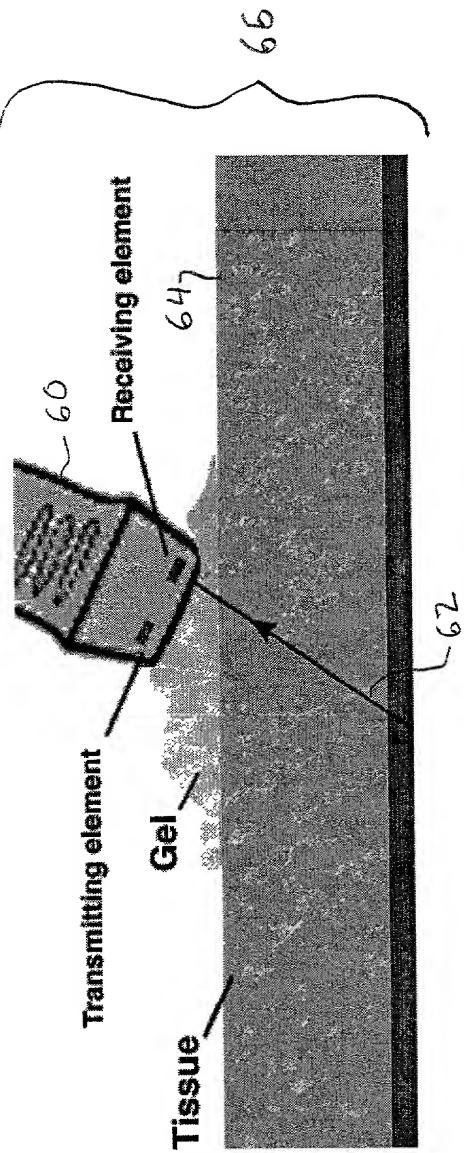
Components of Doppler Equation

Doppler ultrasound transducers use two piezoelectric elements, one to transmit ultrasound **F_t** and one to listen for returning echoes from the moving blood cells **F_r**.

The **factor 2** is present to account for the fact that the Doppler effect actually occurs twice. The first Doppler effect occurs when the transducer is the stationary source of the sound wave and the moving blood cells are the receivers. The second Doppler effect occurs when ultrasound is reflected from the blood cells. The blood cells act as a moving source of sound waves and the transducer acts as a stationary receiver.

v = the velocity of the blood (what we are trying to determine)

Fig. 2



Applications : Study Content - Microsoft Internet Explorer

Address http://learn.phcna.com/phcna/module/section.asp?mid=244&sid=1558&mscid=F72G73DP2CSR2GF40U74MQw04D79E6B

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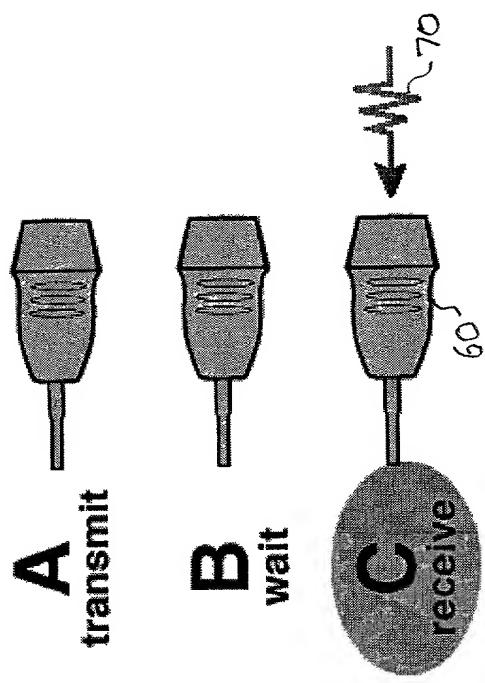
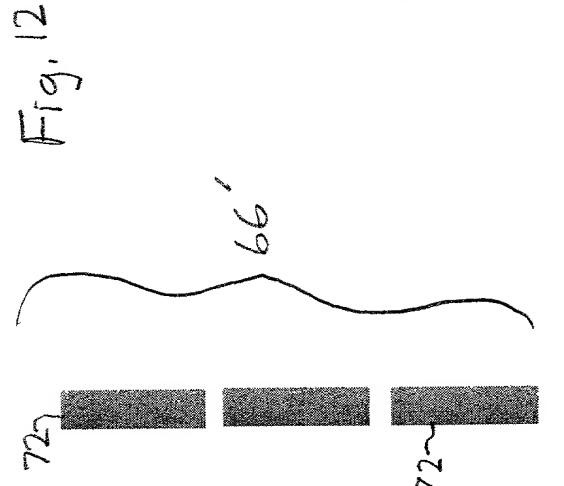
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Doppler Effect
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Pulsed Wave Doppler

Pulsed wave Doppler ultrasound uses a single piezoelectric crystal for both transmission and reception of sound waves. The system transmits short pulses of sound waves at regular intervals. It then waits for a specified time and only then receives signals from a certain depth. This is similar to pulse-echo imaging. Using this technique, the depth from which the signal originated can be calculated.



Applications : Study Content - Microsoft Internet Explorer

Address http://learn.phcna.com/phcna/module/section.asp?mid=244&sid=1060&msecid=FX2G73DP20SR2GF40QJ74MQW04D79E6B

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Quiz

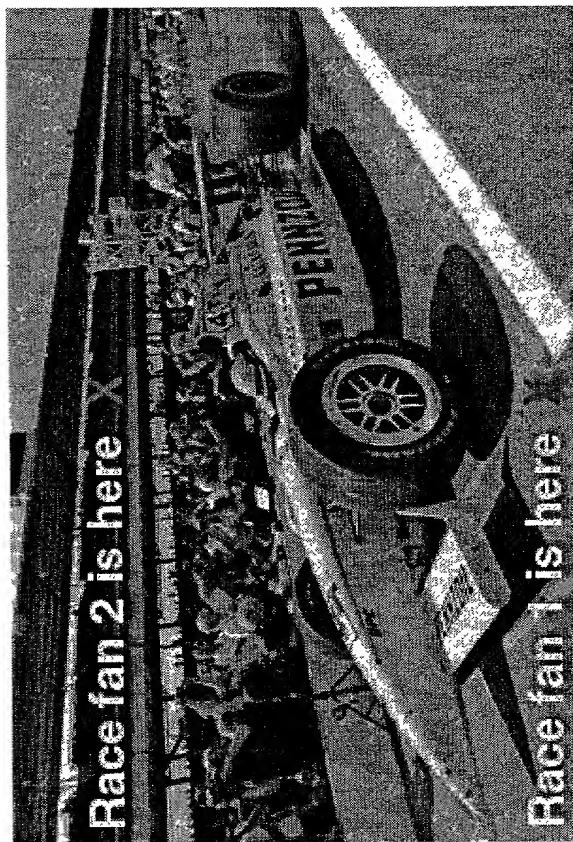


Fig. 13

Analysis and Optimization : Study Content - Microsoft Internet Explorer

Address http://learn.phcna.com/phcna/module/section.asp?mid=250&sid=156&mcssid=FX2G73DP2CSR26F400U74MQw04D79E6B

Doppler Ultrasound Signal Analysis and Optimization : Study Content

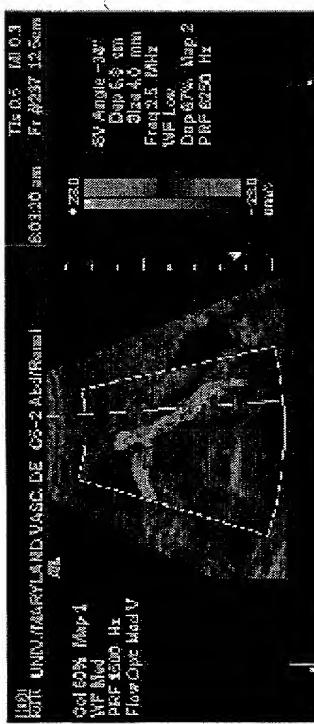
Analysis of Doppler Signal

Maximum Velocity Measurements

The Doppler equation can be used in duplex imaging to convert frequencies into velocities. This is because the angle between the Doppler beam and the blood vessel can be estimated. Analysis of the components of the Doppler waveform shows that many velocities are displayed in the spectrum and these velocities vary with time, due to the cardiac cycle.

The value most commonly used for the measurement of velocity is peak systolic flow. This is the maximum velocity in the spectrum at peak systole. Maximum velocity can also be measured at end diastole. These velocity measurements represent the fastest moving blood flow in the center of the vessel and do not include the slower moving flow near the vessel wall.

Fig. 14



Drag the red dot into the highlighted area and drop it.